



# ***EDU101A NUTRITION***

We all eat! But we don't always get our nutrition information from the place that makes the most sense.

**THIS IS YOUR COMPLETE GUIDE TO MAKING THE MOST SENSE OF BASIC NUTRITION IN A WORLD OF INFORMATION OVERLOAD.**

# REBECCA TOUTANT

**MA, RDN, LDN, CDE**

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Rebecca is a registered dietitian, personal trainer, and certified diabetes educator living, and working in the Boston area.

Since 2004, she's supported clients in health, performance, and disease prevention – balancing their biological needs and performance goals.



She completed her undergraduate degree in Dietetics at the University of Wisconsin–Madison, and her graduate degree in Health Communication at Emerson College and Tufts University School of Medicine.

Areas of focus include sports nutrition, eating disorders, diabetes, developmental disabilities, and celiac disease.

She can be found online at [PLT4M](https://www.PLT4M.com) & [www.NourishingBitsandBites.com](http://www.NourishingBitsandBites.com)



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**CLICK  TO FOLLOW ALONG WITH FUEL 4 FITNESS VIDEOS ALONG THE WAY!**





# ***CHAPTER 1:***

# ***NEEDS FOR***

# ***GROWING***

# ***STUDENTS***



**Needs For Growing**  
**Students**

# Overview

Food. Everybody's doing it. Every human on this planet consumes food (this includes water). Like sleep, feeding and hydrating the human body is absolutely essential. We can survive without television, cars, and smartphones, but not food.

Food provides energy to think, breathe, grow, move, repair, and heal. Food also provides non-energy vitamins and minerals that support essential activities like converting food to energy, developing hormones, supporting the immune and nervous systems, and protecting our body from damage.

While we all eat food, the what, where, why, when, and how can vary dramatically based on various lifestyle factors. Culture, environment, and emotions among other factors can greatly influence what we consume on a daily basis.

The human body does best with a mixture of foods. The food groups and plate method are one approach to understand how to meet those needs (eg, fruits, vegetables, grains, dairy, proteins etc). And most bodies have a preference to replenish fuel regularly – typically every 3-5 hours.

# **Nobody's Perfect**

But in reality, we often don't eat "perfectly," and that's ok. The human body is resilient and flexible. It doesn't require 100% perfection in order to function. The body doesn't have a daily deadline for its needs. Instead, it looks at nutrition as an average over time. It can tolerate and do "just fine" with less than optimal food choices or increased space between meals.

In fact, despite what you see on social media and in documentaries, the only foods you absolutely should not eat are foods that are expired / moldy, that you're allergic to, or need to be avoided due to a medical condition. Beyond that, there are infinite ways to eat well.

# **Surviving Or Thriving?**

But there is a spectrum between "surviving" (just meeting the bare minimum for nutrients) and "thriving" (optimal fueling for performance). The mission with nutrition is to find a balance between giving your body the foods (and nutrients) it needs to thrive while also making sure to include foods that are personally important to you, based on your taste buds, budget, cooking abilities, and culture.

At a bare minimum, every person needs to eat enough energy (aka, calories) each day for the body to function. Even when someone stops growing in height, their muscles, organs, bones, and brain are still developing. New evidence shows that growth and development may continue until the age of 25!

## **Running On Fumes**

Ideally, the goal is to continue to work towards finding ways to thrive with our nutrition. When we don't give our bodies enough fuel, we enter "survival mode". There are a laundry list of potential consequences that can occur when the body lacks the fuel it needs, such as:

- Difficulty concentrating, which reduces our ability to learn as effectively
- Increased irritability and anxiety
- Compromised height development
- Reduced athletic performance
- Reduced interest in and ability to reproduce
- Increased risk of injury
- Reduced bone strength

# **What's Next**

Once a body has enough fuel, you can focus on the quality of the fuel going in. Defining “quality” can be controversial. What you see in the media, and put out by influencers and corporations is not always consistent with science (or realistic for a normal life).

The goal of Fuel 4 Fitness is to cut through the noise and give you the real-life tools and skills to decipher fact from fiction so you can make the best decisions for you.

In the next chapter, we'll explore the chemistry of food and how it affects the human body. From there, we'll talk about how to bring that chemistry to life!

## **Questions**

1: Describe the difference between “surviving” and “thriving” in terms of nutrition?

2: What are some of the symptoms of not getting enough energy over time?



# ***CHAPTER 2:***

# ***Calories***

***Part 1: Energy & Chemistry***

***Part 2: Hunger To Fullness Scale***



**Energy &**  
**Chemistry Video**



**Hunger To Fullness**  
**Scale Video**

# Part 1: Energy & Chemistry

Calories are not evil, and they do not need to be avoided. In fact, calories are essential because they are what our bodies convert to energy. In our previous lesson, we talked about what happens when bodies don't get enough energy. But where IS the energy in food?

There are four chemistries (or types) of calories, and they may sound familiar – carbohydrates, proteins, fats, and alcohol. The first three chemistries are necessary for human health, but the last (alcohol) is not.

These chemistries are not exactly the same as the food groups we were taught when we were younger. Any given food (and food group) can be a combination of energy chemistries.

Looking at food in terms of chemistry instead of food groups is a little complicated at first. But it helps us understand foods that don't fit cleanly in a food group (e.g., pizza).

And it allows us to get past “good” or “bad” food. Instead, we can look at a food's chemistry and better predict how it will impact performance and health.

# **What our body sees when we eat?**


Bodies don't recognize food groups. When we eat a banana, our body doesn't say, "Ah-ha! A fruit!"

Instead, it sees carbohydrates in the form of sugar, starch, and a little fiber. It also sees a little protein and fat, as well as a slew of vitamins and water. Here are a few examples of the the energy in our food:

- Fruits: Water + carbohydrate (sugar, starch, fiber)
- Vegetables: Water + carbohydrate (little starch, mostly fiber)
- Beans / Lentils : Carbohydrate (starch, fiber) + protein + little fat
- Meat / Eggs / Fish: Protein + fat
- Grains: Carbohydrate (starch + some fiber) + some protein + little fat
- Milk/Yogurt: Water + Carbohydrate (sugar) + protein + fat

# ***The Energy In Food***


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 = **WATER** + **CARB**  
**FRUITS** **STARCH FIBER SUGAR**

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 = **WATER** + **CARB**  
**Veggies** **STARCH FIBER**


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 = **CARB** + **PROTEIN** + **FAT**  
**Beans** **STARCH FIBER**

---

 = **PROTEIN** + **FAT**  
**Meat, Fish, Eggs**

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 = **CARB** + **PROTEIN** + **FAT**  
**Grains** **STARCH FIBER**

---

 = **WATER** + **CARB** + **PROTEIN** + **FAT**  
**Milk + Yogurt** **SUGAR**

# **How many calories do we need?**

Now that we have an understanding of “what” calories are, how do we figure out how many to consume? The human body has a wide range of energy needs so it’s difficult to put an exact number on it.

There are formulas and general recommendations, but there can be huge variances based on sex, age, height, muscle mass, and physical activity intensity and duration. Even factors like what we eat, how often we eat, and our mental health can impact energy needs.

But in general, boys between the ages of 13-19 need at least an average of 2000-3000 calories per day, and girls ages 13-19 need at least an average of 1600-2400. But it’s not uncommon for active, growing bodies to need more, and there can be tremendous day-to-day swings in energy needs based on activity.

There’s also nothing magical about the number. Bodies are incredibly flexible, and can easily adapt to increased and decreased intake without changing the body itself.

How do we assess if we are eating too little or too much? How do we do this in an easy and straightforward way that we can apply to our daily lives? In our next lesson, we will explore ways to listen to the body to determine our energy needs.

# **Part 2: Hunger To Fullness Scale**

Calories are the energy that our body needs to survive. In Part 1, we looked at the chemistry behind calories, and talked generally about how many we need to survive. Yet everywhere we look, we see calorie counts and suggested food amounts.

Instead of looking at our calorie count as a magical number, if we continue to look at calories as energy, then we can start to figure out just how much fuel or energy we need on a given day.

## **So how do we gauge intake?**

If you are concerned about eating too much or too little, it's best to talk with a registered dietitian to create a personalized plan based on your unique needs. I do not universally recommend tracking food (or calories) in an app, website, or journal, because the practice can cause harm if not done with care, and a thorough understanding of its role in guiding nutrition goals.

Instead, especially for high school students, it's more valuable to pay attention to signs from your body that you're giving it enough fuel.

## **Signs you're not eating enough energy:**

- Low energy / fatigue
- Difficulty concentrating
- Bloating and/or constipation
- Tired
- Stalled training
- Missed menstrual cycles
- Constantly thinking about food
- Irritability
- Hair loss / brittle nails
- Constantly getting sick

Weight and body shape are not great indicators of whether you're over or under fueling. Growing bodies are designed to change. They gain weight to grow taller, increase bone density and length, develop muscles and organs, etc.

And the body shape changes as hormones dictate what's necessary for life. Restricting energy in an attempt to control weight can get in the way of growth and development.

Finally, under fueling sacrifices athletic performance – limited fuel leads to poor training, resulting in minimized strength and endurance gains.

# **What About Too Much?**

Determining whether or not you're eating MORE energy than what your body needs is a bit trickier. Weight itself is not a great indicator because on any given day, a body can change 5-8 pounds based on water shifts alone – it has nothing to do with weight gain.

Instead of focusing on weight, I prefer to focus on signs someone might be eating in a way that makes them feel unsatisfied and, in turn, regularly eat beyond the point of physical need. These include:

- Going more than 5 hours without eating
- Feeling extremely hungry by the time they eat
- Constantly thinking about food
- Feeling anxious around food
- Rigid food rules (e.g., foods you can eat and foods you cannot)
- Making up for foods you're "not supposed to have"
- Having "cheat" days
- Feeling out of control around foods
- Eating in front of the tv, phone, computer, books
- Feeling "full" but still wanting more / different food
- Regularly eating to avoid feeling emotions
- Feeling guilt or shame around food

# **Hunger Signals**

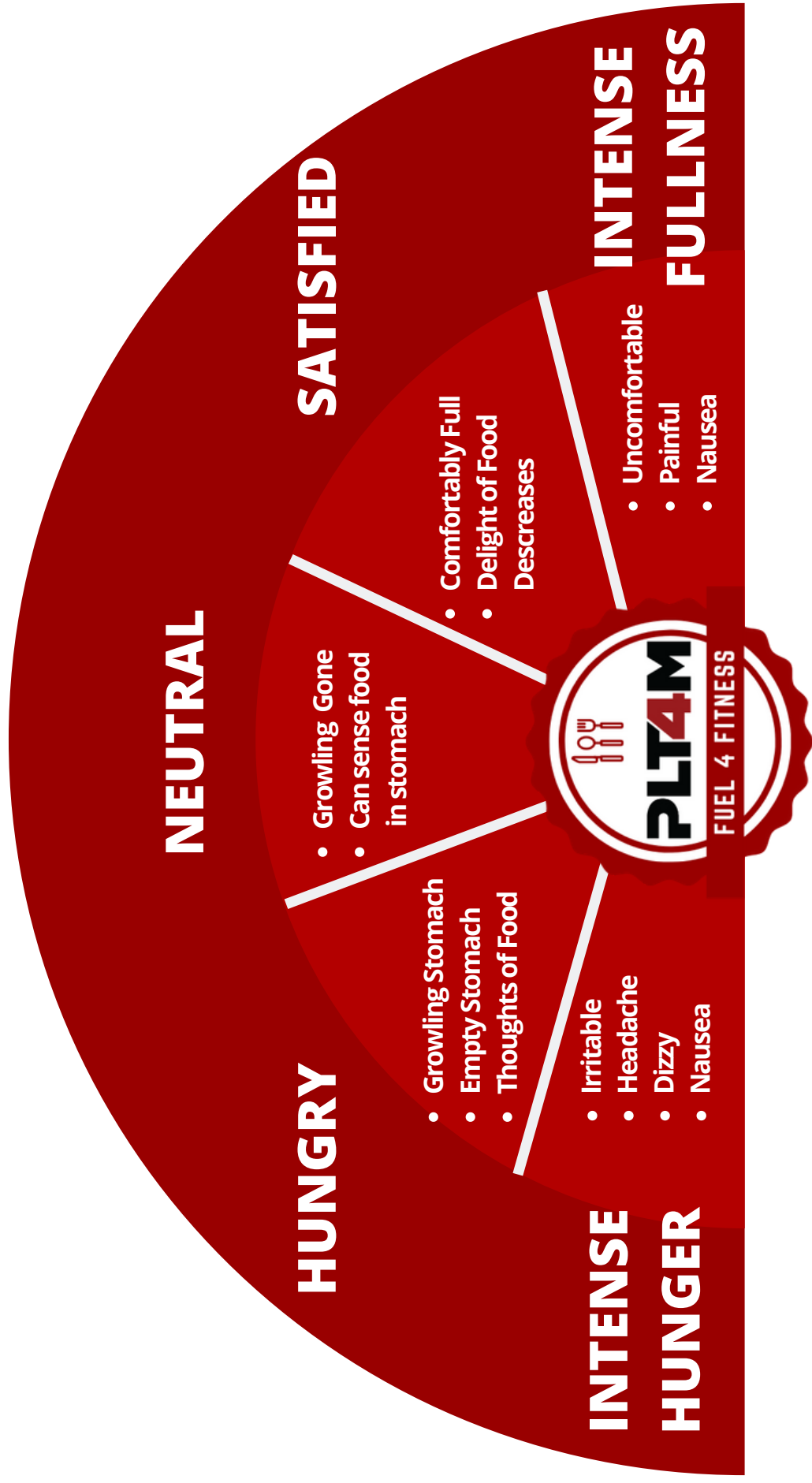
One tool to help gauge energy needs is your body's hunger signals.

When the body begins to run low on fuel, it sends signals to the body that increase interest in food. Those signals make you think more about food, and notice clues of food around you, such as the smell of a bakery or an advertisement on social media.

Your stomach may feel a little empty, and the thought of food is appealing. As hunger grows, so does the intensity of the symptoms. The stomach growls louder and often gets upset. We have difficulty concentrating, feel irritable, dizzy, or light headed and may develop a headache.

When we wait until we're ravenous, we are more impulsive around food, and tend to eat quickly. We eat anything and everything. We are particularly driven towards foods that give us energy, quickly, and in large amounts.

When we are in this state, we are more likely to eat beyond our energy needs and until we're uncomfortably full. This is a natural and normal reaction to going too long without food because our body is "making up" for lost time.



**HUNGER** → **FULLNESS SCALE**

# **Listening To Our Bodies**

Eating is a biological need, just like breathing. You can hold your breath as long as you'd like, but the longer you try, the greater the gasp you're going to take when your body can't stand the oxygen deprivation anymore. The longer we wait to eat, the 'gasp' we take comes in trying to consume too much food.

The "right" time to eat is when we are just beginning to feel the desire for food. It's the "I could eat" point of hunger. In this place, we can be thoughtful about what we want to eat and what our bodies need. We are more likely to enjoy the experience and feel more satisfied.

Have you ever felt full, but not satisfied? Like you were "stuffed" from eating the foods you were "supposed" to have, but still wanted to have "the treat?"

Consistently eating "enough" energy is the first step to fueling the body. However, the chemistry of the food makes a big difference in your hourly energy levels, as well as the enjoyment of the food experience itself.

In our next lesson, we'll look at the different types of energy and how they affect our energy, health, and performance in the gym or on the field.

## **Questions**

- 1: What are the 2 major classifications of nutrients?
- 2: Name at least 5 things that influence a person's energy needs?
- 3: On average, how many calories do people need?
- 4: Name at least 3 signs of not getting enough energy?
- 5: What's the primary indicator of someone's body size?
- 6: How much does a person's body weight change on average between the beginning of the day and end of the day?
- 7: What are at least 3 of the behaviors that might drive someone to eat beyond what their body needs?
- 8: What are at 2 signs of mild to moderate hunger?
- 9: What are 2 signs of extreme hunger?



# **CHAPTER 3:** ***Carbohydrates***

***Part 1: What & Where?***

***Part 2: Choices: Sugar, Starch, & Fiber***



**What & Where**



**Choices: Sugar,  
Starch, & Fiber**

# **Part 1: What & Where**

Before we dive into the wide world of carbohydrates, let's make sure we have a clear definition of what they are.

Popular culture refers to things like grains and sugars as carbs. However, carbohydrates refer to the chemistry that make up any plant-based food. Fruits, vegetables, grains, and sugars are all made of carbohydrates.

When we talk about carbs, we are referring to the chemistry of the food (carbon, hydrogen, and oxygen).

All carbs are created from sugar molecules (glucose, fructose, galactose). What changes between the types of carbohydrates (sugar, starch, and fiber) are the number of molecules, and the complexity of the bond between the molecules, making them easier or harder to break apart.

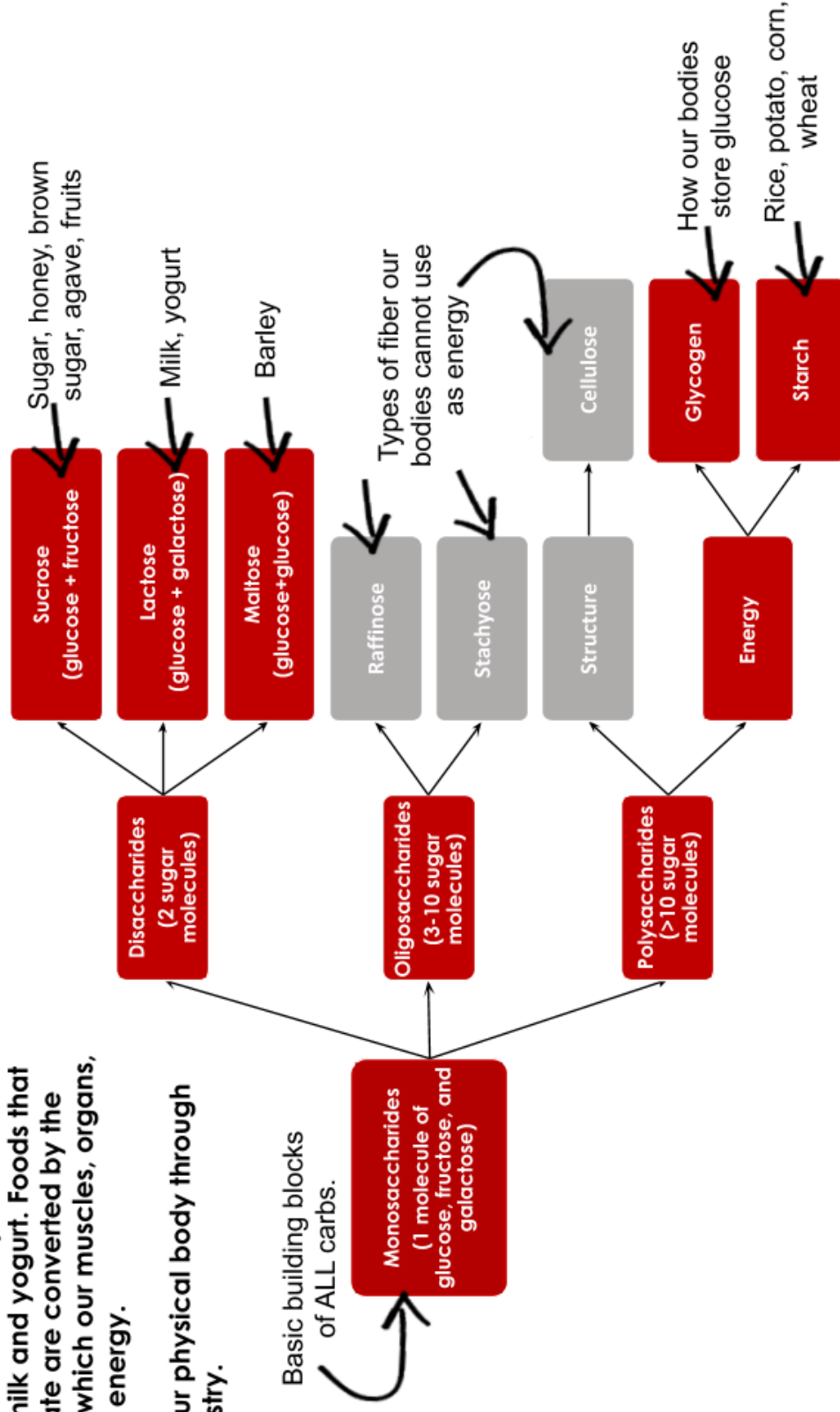
As those molecules bind together in various ways, they form compounds we are more familiar with. These include things such as starch (found in potato, grains, corn, etc.), fiber (something we can't digest), sugars (found in milk, yogurt, fruits and sweeteners like honey, syrup, cane sugar).

# Carbs

Carbohydrates come from any food that is a plant as well as milk and yogurt. Foods that have carbohydrate are converted by the body to glucose which our muscles, organs, and brain use for energy.

Food nourishes our physical body through balanced chemistry.

Basic building blocks  
of ALL carbs.



# What they do for us

There is a lot of confusion and concern about carbohydrates these days. So before we get any further, let's be clear: Carbohydrates are not evil!

Carbohydrates are the perfect package of nutrients for the body and provide many benefits such as:

**1) Energy** – Our body can quickly break down and use energy from carbohydrates to think and move. Fat and protein take more time and effort, making them a lower quality fuel source. Our brain alone uses around 400 calories of carbohydrates per day (or approximately 120 grams).

**2) Fiber** – Found in whole grains, fruits, and vegetables. Fiber cannot be digested. It keeps us regular in the bathroom, prevents disease, and stabilizes energy. It also keeps us fuller longer. Beneficial for gastrointestinal health, disease prevention, and feeling fuller longer. You cannot get fiber from animal-based foods. Fiber, by definition, is a type of carbohydrate.

**3) Antioxidants** – Prevent against free radicals that can cause disease. You won't find antioxidants in animal-based foods.

**4) Protein** – Plant-based proteins can meet all of our protein needs without the need to eat meat, but have to be appropriately paired for good nutrition (more on this in the protein chapter)

**5) Vitamins and minerals** – Carbohydrates provide a wide variety of nutrients, including b-vitamins (thiamin, riboflavin, and niacin) used to convert food to energy and support our nervous system, calcium for our bones, iron to support oxygen transport in the blood, and folate to help us produce red blood cells.

# Carbohydrates = Energy.

As you can see, at the top of the list is the energy we can get from carbohydrates. Carbohydrates are the preferred fuel source for the body. Ideally, people should have at least 50-75 percent of their daily energy needs from carbohydrates – a mixture of fruits, vegetables, and grains.

When we eat something with carbohydrates, whether it's a fruit, grain, vegetable, or sweetener like sugar, our body can quickly break down the molecules of carbohydrates and turn them into blood glucose (aka blood sugar).

The blood glucose is then transported to the muscles, brain, and vital organs to convert to energy (or ATP). Any unused glucose gets stored for later, and when those storage spots are full, it can convert it to body fat for later use. In other words, energy now, and energy for later.

**MYTH BUSTING:** Before anyone panics when they see body fat, let's dispel another myth. The myth that carbs convert to body fat more than other nutrients is not true. Our body is constantly putting nutrients in and out of storage. It never "throws" them away. This is a natural and normal part of human physiology and not something unique to carbs and blood glucose. They are NOT more likely to become body fat than any other nutrient.

# Different Types Of Energy.

One of the benefits of carbohydrate-rich foods is that they can give you energy quickly. So if you're trying to fuel up to train, study, or go about your day, carbohydrates should be the food of choice.

The downside is that because carbohydrates are digested and absorbed quickly when we eat a meal that is purely carbohydrates, we tend to feel hungry sooner. Conversely, when we eat foods with more protein and fat, we feel fuller longer, as these take longer to break down. For example, a plate of pasta with salad is filling, but it likely won't keep you full as long as a plate of pasta with chicken and salad.

Sugars provide energy the fastest. However, because sugar is broken down and absorbed quickly, it leaves us looking to replace energy faster than when we consume starch. If we add fiber to the equation, we get even more sustainable energy. Add protein and fat, and we get the most sustainable energy.

However, you don't need chemistry to explain that to you. You can feel the difference when you drink a can of soda vs. eating a turkey sandwich. Both have the same carbohydrate content, but where those carbohydrates comes from, and what it's paired with, makes all the difference.

# DURATION OF FULLNESS



The more complicated the chemistry (eg, the more fiber, protein, and/or fat) the longer the body feels full – upwards of 3-4 hours!  
“Simpler” chemistries leave us hungry sooner.

# **What comes next?**

As you can see, there is a lot of overlap when it comes to talking about carbohydrates. Hopefully, you can see that carbs are good for us, and provide us energy to fuel our lives. The next question that almost inevitably follows, is how to decipher between “good” and “bad” carbs?

So, let us be clear. Carbohydrates are not “good” or “bad” – they’re just different chemistries with different purposes. Instead of looking at carbohydrates as good and bad, you will notice that we have talked a lot about sugar, starch, and fiber.

In our next chapter, we will break down the three types of carbohydrates in more detail. We will talk about where to find them, and what they do for us! Understanding the chemistry allows you to better plan and balance your meals for health and performance.

# **Part 2: Sugar, Starch, and Fiber**

Not all carbohydrates are created equal when it comes to energy. Some provide rapid energy in small amounts, and others more sustained, slow energy. The amount of carbohydrates in any given food exists on a spectrum. A lot of this has to do with the makeup of the carbohydrates.

Let's explore what sugar, fiber and starch are. Then we can start to talk about where, and how to go about our day of fueling with carbohydrates.

## **Sugar**

The word "sugar" is tricky. When most people talk about sugar, they are referring to sweeteners – like granulated sugar, powdered sugar, honey, and syrup (to name a few).

But sugar is not just sweeteners – it's a type of chemical compound that can be found naturally in many foods (like fruit, yogurt, and milk). Our body "sees" all these sugars the same. However, when we get sugar in natural foods (like fruit and milk), we get things like fiber, fat, and protein that slow absorption and metabolism.

All sugars and sweeteners are made of 1-2 molecules, which makes them very easy to digest and break down. Sweeteners have little to no water, fiber, or nutrients associated with them. They tend to provide more energy per serving than “natural sugars,” which include water, fiber, and other nutrients.” But sweeteners don’t take up much space in the stomach compared to “natural sugars” making them an ideal source of rapid energy such as going into an intense workout or refueling in the middle of a workout.

Using foods high in sweeteners to fill your appetite means you’re missing out on nutrients. This means you are more likely to have irregular energy. The lack of nutrients and volume in sweeteners means you are likely to consume more than what your body needs. On the other hand, if you need energy, but can’t tolerate much in your stomach, sweeteners are a decent fuel source.

In a few pages, we will compare the difference between oranges and orange juice to think about while similar, the orange might leave us more 'full' where the juice can give us more rapid energy. A perfect example of the differences we are discussing with sugar here.

There is no “best” or “worst” sugar. Our body sees all sugar the same way, whether it’s white, brown, maple syrup, honey, or “natural.” Instead, it’s about understanding how to balance sugar for function (e.g., energy) and enjoyment (e.g., cake).

# **Starch**

Starch is another type of carbohydrate found in foods. It has more molecules than sugar. Its chemistry is not as complex as fiber, and therefore it can be broken down by the body, and used as fuel.

It's the primary energy found in grains (flour, bread, cereal, pasta, rice, oatmeal, crackers) and some vegetables (potato, sweet potato, yams, corn)

# **Fiber**

Fiber is a type of carbohydrate that our bodies cannot digest. The chemistry is so complex that our body lets it pass right through. Because of its complexity, it tends to slow down our digestive process, leaving us feeling fuller, longer. Additionally, as it moves through our digestive system, it acts like a broom, sweeping along with it any other waste that needs to get removed from the body. Vegetables, beans, nuts/seeds, fruits, and whole grains are all rich in fiber.

Foods high in fiber are a great source of food if you're looking for sustained energy, and a longer lasting sense of "fullness". Conversely, if you're looking for rapid energy, fiber is not a good choice, given its inability to be broken down.

# Energy In Different Forms

The amount of carbohydrates exists on a spectrum – some food groups don't have as much energy available as others. And where it comes from on a plant often changes the density of the energy it provides.

- Vegetables, for example, are mostly water with some fiber and a little carbohydrate.
- Fruits have a bit more carbohydrates in the form of sugar and fiber.
- Grains have even more carbohydrates from starch and sometimes fiber.
- Sugar (or sweetener) is pure sugar, and provides the most energy per serving.

## Carbohydrates

**Source:** Any food that comes from a plant (+ milk, yogurt)

**Function:** Rapid source of energy (known as blood glucose).

**Ya-hoo...** Provides fiber, vitamins and minerals and crucial antioxidants to protect against disease

**Uh-oh...** Rapid digestion = hungry sooner!



**Non-starchy  
Vegetables**



**Fruits**



**Starchy  
Vegetables**



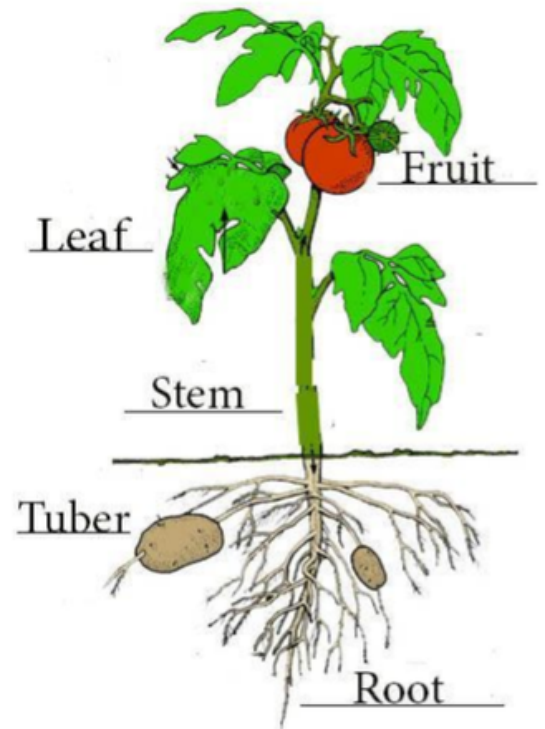
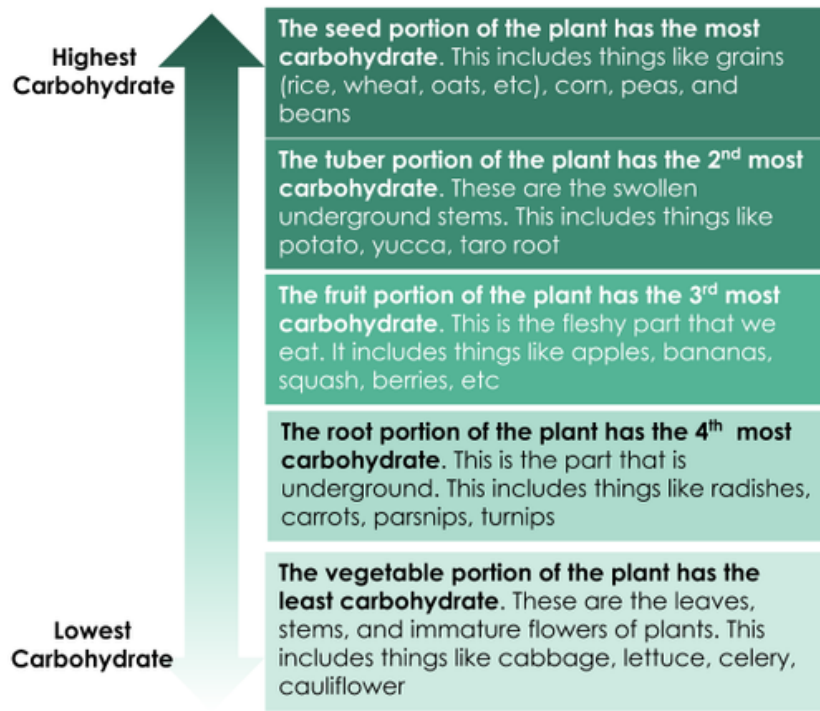
**Grains**



**Sugar**

LEAST energy per serving

MOST energy per serving



Carbohydrates are not evil – they are a fuel source, that when used well, can do great things for the body. Most foods come with a label (or can be looked up online), and from there, if you understand what to look for, you can choose foods that work best for your goals.

You can look at a label and understand exactly what a food is made of, and how your body will use it as fuel. Let's look at an orange vs. an 8 oz glass of orange juice.

Scroll down to the portion where it says "carbohydrate." You'll see that a glass of orange juice has 26 grams of carbohydrate. 21 of those grams come from sugar, and ½ gram comes from fiber.

But you'll also notice that  $21 + \frac{1}{2} = 21 \frac{1}{2}$  (not 26). Labels don't have to label for starch.

Essentially, most of the energy you get from orange juice is from sugar – it’s a rapid fuel source and won’t keep you full for long.

When you look at the orange, it has 15 grams of carbohydrate, 12 of which are from sugar. And 3 of which are from fiber. It will give you rapid energy, but not as quick as orange juice.

### Orange juice

Fruit juice

Orange juice is the liquid extract of the fruit of the orange tree, produced by squeezing oranges. It comes in several different varieties, including blood orange, navel oranges, valencia orange, clementine, and tangerine. [Wikipedia](#)

#### Nutrition Facts

Orange juice

Amount Per 1 cup (248 g)

Calories 111


	% Daily Value*
<b>Total Fat</b> 0.5 g	0%
Saturated fat 0.1 g	0%
Polyunsaturated fat 0.1 g	
Monounsaturated fat 0.1 g	
<b>Cholesterol</b> 0 mg	0%
<b>Sodium</b> 2 mg	0%
<b>Potassium</b> 496 mg	14%
<b>Total Carbohydrate</b> 26 g	8%
Dietary fiber 0.5 g	2%
Sugar 21 g	
<b>Protein</b> 1.7 g	3%
Vitamin A 9%	Vitamin C 206%
Calcium 2%	Iron 2%
Vitamin D 0%	Vitamin B-6 5%
Vitamin B-12 0%	Magnesium 6%

\*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.



### Orange

Fruit



The orange is the fruit of the citrus species *Citrus × sinensis* in the family Rutaceae. It is also called sweet orange, to distinguish it from the related *Citrus × aurantium*, referred to as bitter orange. [Wikipedia](#)

#### Nutrition Facts

Orange

Amount Per 1 fruit (2-5/8" dia) (131 g)

Calories 62

	% Daily Value*
<b>Total Fat</b> 0.2 g	0%
Saturated fat 0 g	0%
Polyunsaturated fat 0 g	
Monounsaturated fat 0 g	
<b>Cholesterol</b> 0 mg	0%
<b>Sodium</b> 0 mg	0%
<b>Potassium</b> 237 mg	6%
<b>Total Carbohydrate</b> 15 g	5%
Dietary fiber 3.1 g	12%
Sugar 12 g	
<b>Protein</b> 1.2 g	2%
Vitamin A 5%	Vitamin C 116%
Calcium 5%	Iron 0%
Vitamin D 0%	Vitamin B-6 5%
Vitamin B-12 0%	Magnesium 3%

\*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.



There is a lot to unpack when it comes to figuring out what and when to eat. Here are some basic goals, principles and examples in determining the types of carbohydrates to pick.

*Please note exact portions vary depending on your energy needs. Additionally, some stomachs are more sensitive than others so may require additional modifications..*

## GOAL

## PRINCIPLE

## EXAMPLES

### Need food to sustain appetite and/or energy

- Choose high fiber, low sugar sources
- Pair with a fat/and or protein
- Normal meal of fruit/veg w/whole grains and protein

- Turkey sandwich w/lettuce, tomato, onion and a side of fruit
- Rice, chicken, steamed vegetables/salad
- Pizza and salad
- Pasta, Chicken/Meatballs& Steamed Veggies

### Need food to give energy for an intense workout within 1 hour

*Food takes time to digest. Best to avoid foods that create large volumes (eg, vegetables) and are hard to digest (eg, lots of fiber, fat, protein)*

- Avoid high fiber (eg, beans and vegetables not ideal)
- Stick with starch /sugar as energy source
- Ok to have moderate fiber, fat, protein

- Peanut butter and jelly
- Banana / apple and peanut butter
- Some trail mix (fruit and nuts)
- Pretzels or crackers with cheese
- Oatmeal
- Bagel with cream cheese or peanut butter

### In the middle of an intense workout (eg, running, sprinting, powerlifting) and/or in hot weather and need a fuel boost

*When heart rate is high, blood goes to the muscles and digestion is restricted. Need foods that are easy to digest and give energy in small doses*

- Avoid fiber
- Best to avoid dairy as well as fat and protein - may cause stomach upset
- Choose sugar / starch - easy to chew and digest with low volume

- Sport drink
- Gummy snacks
- Dry fruit
- Low fiber, low protein cereal bar
- Fig newtons
- Pretzels Crackers

### In the middle of a low intensity workout (eg, golf, walking) and need a fuel boost

*Typically able to tolerate most foods when heart rate is relatively low. Better to choose foods that will sustain energy*

- Choose starch as fuel source.
- Ok to pair with protein and/or fat.

- Pretzels Crackers
- Trail mix (fruit and nut)
- Bread + peanut butter
- Cereal bar
- Banana with nuts
- Apple with cheese

# **Questions**

- 1:What are the main types of carbohydrates?
- 2: Which food groups contain carbohydrates?
- 3: What functions do carbohydrates serve in the body?



# **CHAPTER 4:** ***Protein***

***Part 1: Where, What, & How Much***

***Part 2: Misconceptions & Myth Busting***

***Part 3: Understanding Plant Proteins***



**Where, What, &  
How Much?**



**Misconceptions &  
Myth Busting**



**Understanding  
Plant Proteins**

# **Part 1: Where, What & How Much?**

Protein is the second nutrient we'll explore on our nutrition journey. Recall that we started by understanding the importance of nutrition for growing bodies and unpacked some of the ways our body communicates its needs.

From there, we explored the idea of energy - what it is and where it comes from. We took a deep dive into the body's primary energy source - carbohydrates. And now it's time to figure out what's up with protein.

Does it live up to the media hype? Like the other macronutrients (carbohydrates and fat), our body uses protein as energy. But it's valuable for other functions as well. Additionally, depending on where you get your protein, there are some considerations for your daily routine.

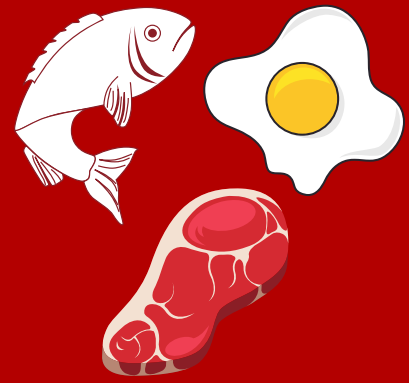
## **Where It's Found**

Remember that when we talk about "protein," we're not just talking about food groups. We are talking about the chemical compounds found within foods.

Protein can be found in animal-based foods like beef, chicken, pork, fish, eggs, yogurt, milk, and cheese.



# Protein Sources



## Plant

<b>1/2 Block Tofu</b>	<b>10g</b>
<b>1 Cup Beans</b>	<b>15g</b>
<b>2 T Peanut Butter</b>	<b>8g</b>
<b>3 oz seitan</b>	<b>18g</b>
<b>1 Veggie Burger</b>	<b>7-12g</b>
<b>1 T Spirulina</b>	<b>4g</b>
<b>1 oz Almonds</b>	<b>6g</b>

## Animal

<b>1 Large Egg</b>	<b>7g</b>
<b>1 Egg White</b>	<b>4g</b>
<b>6 oz Yogurt</b>	<b>7-12g</b>
<b>1 Slice/oz Cheese</b>	<b>7g</b>
<b>8 oz Milk</b>	<b>7g</b>
<b>1 Cup Cottage Cheese</b>	<b>25g</b>
<b>4 oz Chicken/Fish/ Beef/Pork</b>	<b>28g</b>

***You can also get protein from animal and plant based protein shakes. However, one of the values of protein is not only the amino acids, but also the vitamins and minerals that are found in protein rich foods. It's best to obtain your protein needs from real food whenever possible as opposed to supplements, pills and shakes.***

Protein can also be found in plant-based foods like nuts, seeds, beans, lentils, peas, tempeh, and tofu. Lastly, grains like oatmeal, quinoa, wheat, and rice have protein as well, albeit smaller amounts.

## **What it does**

Protein is a crucial nutrient for humans that goes beyond energy. Proteins are made of chains of amino acids. Amino acids are often called the building blocks of life - and for a good reason.

Our bodies break down those chains and use the amino acids to support growth and development, biochemical reactions, the immune system, and neurological functions. Amino acids also transport nutrients, send biochemical messages, create structures, and repair muscles.

If we don't get enough protein over time, humans can develop a serious condition called "protein-calorie malnutrition." In our modern world, it's not common unless someone is severely restricting their food or avoiding all protein sources. But in developing countries where food is scarce, it's more common.

While protein is important, protein has been glorified beyond what's needed for health and performance. Most people in the United States get more protein than they need each day.

# **How Much We Need**

Protein needs are personally driven, and are typically based on weight, age, as well as the type, intensity, and duration of the training you do.

For those who are inactive, the recommendation from the International Society of Sports Nutrition (ISSN) is around .8 to 1.2 grams of protein per kilogram (.3 to .5 grams per pound).

For those who are active, ISSN notes that needs often increase to 1.4 to 2 grams per kilogram (.6 to .9 grams per pound) to support repair.

Those who are more intensely active or doing intense power or strength training, tend to be on the higher end of the scale. Needs also might fluctuate day to day, and season to season depending on training.

To put that in perspective, a 150-pound athlete would need between 90 and 150\* grams of protein per day. It's possible to get that from food depending on appetite needs and food availability.

Let's break that down further, meal by meal:

- Breakfast - 1 cup greek yogurt (12 grams)
- Snack - 2 eggs (14 grams)
- Lunch - 1 cup beans (15 grams) with 4 oz chicken (28 grams)
- Snack - 1 cup greek yogurt (12 grams)
- Dinner - 4 oz chicken (28 grams)

= approximately 96 grams

Simply add three, 8 oz glasses of milk (7 grams of protein), and you've got another 21 grams of protein pretty easily.

Grams of Protein Per Day by Weight and Activity				
	Non Athlete Range <i>grams per day</i>		Athlete Range <i>grams per day</i>	
Weight	.3 g / lb	.5 g / lb	.6 g / lb	.9 g / lb
120 lb	36	60	72	108
150 lb	45	75	90	135
175 lb	52.5	87.5	105	157.5
200 lb	60	100	120	180
225 lb	67.5	112.5	135	202.5
250 lb	75	125	150	225
Please note that needs are approximate and are displayed here as an example. Individual needs may vary.				

# **Health Benefits Of** **Protein Rich Food**

There are 21 amino acids that are the building blocks of life. Nine of those amino acids are called "essential" because our bodies cannot make them and therefore they must come from our food. When we eat an animal source of protein, we get all of the essential amino acids within that food - no questions asked.

However, plants do not contain all of the essential amino acids in one package. Instead, different plants have different packages of amino acids. To get everything you need, you have to pair proteins for the full package.

For example, when we eat beans along with a grain such as rice, we get two different subsets of amino acids. Similarly, peanut butter on bread would provide the right combination of different amino acids for your body.

However, amino acids are not the only benefit of protein-rich foods. There's also a wealth of nutrients in protein-rich foods in varying amounts. These include:

- Iron for oxygen transport
- Vitamin B12 for our nervous system and red blood cell production
- B-vitamins (niacin, thiamin, riboflavin, and B6) provide a variety of functions in metabolism as well as our nervous system
- Magnesium helps build bones and supports muscle function
- Zinc can support your immune systems

In addition to vitamins and minerals, most animal sources of protein also contain fat, in the form of saturated fat. Fat is an essential nutrient for human health as it supports hormone development, and provides flavor and satisfaction.

Saturated fat however, in large amounts, over a long period of time, is not great for heart health. That doesn't mean animal proteins need to be avoided. It's a matter of balancing higher fat protein options (bacon, sausage, ribs, hot dogs) with leaner options (chicken, turkey, fish, eggs). We'll learn more about the types of fat and how they support the body in the next module.

# **Part 2: Misconceptions & Mythbusting**

## **Myth: Just by eating protein you will 'get bigger'**

Protein by itself does not increase body strength or physical size. The only way to gain muscle is to do exercise, or to do physical activity like strength training.

Eating protein with a little bit of carbohydrates after your workout supports muscle growth and strength development. But the benefit tends to max out around 20 grams post-exercise.

But gains are NOT in direct proportion to protein intake. This means that consuming protein does not make you bigger.

The size of the muscle has much more to do with training styles, rest and recovery, genetics, and muscle building hormones such as testosterone.

## **Myth: Protein is superior to all other macronutrients**

Protein is not superior or inferior to other macronutrients. It's just different.

It provides a different set of benefits. Protein-rich foods tend to have different nutrients attached to them versus carbohydrates and fat-rich foods.

Yes, protein can provide energy, just like carbohydrates and fat do. However, the quality of the energy it gives is different, and the functions that it serves for the body are different.

Protein will keep you fuller longer than carbohydrates, but duration of fullness is not necessarily a health benefit - it's just a difference in how quickly it's digested.

Keep in mind though, that taking longer to digest means it's not a readily available source of energy like carbohydrate.

So if you eat a protein-rich food before you try and exercise you're going to feel way more sluggish than if you had something rich in carbohydrate.

## **Myth: There's no such thing as too much protein.**

Our body really doesn't need super high doses of protein. And having high doses of protein doesn't lead to more benefits.

In general, the body can utilize up to roughly 20 grams of protein for repair after hard exercise, and that can easily be achieved with food such as a turkey sandwich or Greek yogurt.

Ideally, the protein is paired with carbohydrates because that helps the amino acids access the muscle. While consuming high doses of protein may not "harm" you, prioritizing protein-rich foods over carbs and fats runs the risk of pushing out beneficial nutrients such as fiber and antioxidants from grains, fruits, and vegetables.

## **Myth: Protein Powders Are Required When Training.**

Protein powders are not the same as eating protein-rich foods. Yes, they contain a whole bunch of amino acids, but so do animal sources of protein as well as properly paired plant protein. They are not superior to real food - they are just a convenient supplement (not alternative).

Protein powders are typically only protein, either from plants (soy, hemp) or animals (whey, egg, casein). But because they're only protein, they do not contain the nutrition "package" of important nutrients like protein-rich foods (see the section on nutrients in protein-rich foods).

The benefit of a protein powder is that it's convenient. It's easy to take different places. You don't have to worry about it spoiling, or going bad in your locker or backpack. Protein powders are also low volume foods. So if you're a person who struggles with appetite, it's an easy way to get fuel for recovery without having to force-feed yourself.

However, protein powders are not a substitute for real food because you miss out on so many vitamins and minerals as well as antioxidants. If you're going to include protein powders in your routine as an occasional meal "replacement," talk with a dietitian to make sure you have a plan to meet your nutrient needs.

To maximize nutrition, it's preferred to blend them with real food. Examples include fruits and vegetables, like spinach and kale, fresh or frozen fruit, nuts and seeds. These help to get in some of the other nutrients that you're missing in your day.

Keep in mind that protein powders are not regulated for their labeling. That means they can put health claims and "promises" on the front that aren't real. And what they "say" is in it, may not always be accurate.

There have been many cases of unhealthy chemicals in supplements like protein powders that are terrible for the body, and negatively impact the heart, lungs, liver, and digestive system. If you are interested in using a protein powder, talk with a dietitian or doctor to decide which protein powders, and brand can be trusted.

# **Part 3: Understanding**

## **Plant Proteins**

It is possible to get the protein we need without eating animal-based foods. But it takes careful planning and consideration to get the nutrition you need.

One of the most significant benefits of plant proteins is that they come with additional nutrients such as fiber and antioxidants. Those antioxidants are great at protecting us from disease. We don't get antioxidants from animal-based foods. However, there are drawbacks to getting protein from plants.

### **1) They're not as dense as animal proteins.**

Ounce for ounce, plants do not contain as much protein as animal-based foods. That means you have to eat a larger volume of food to get the same amount of protein as we do from an animal product. For example, a 4 oz breast of chicken, which is about the palm of your hand, has about 28 grams of protein.

To get that amount of protein from plants, you'd have to eat 1 ½ cups of cooked beans and a ½ a cup of rice. And please note that most veggie burgers have little to no protein depending on the brand - check the label!

## **2) Plant proteins also do not provide all of the essential amino acids**

Different plants have different packages of the essential amino acids we need as humans. To get all of the amino acids that you need, you have to combine different foods such as beans or lentils with grains. For example, rice and beans or peanut butter and bread.

## **3) It's a different type of iron.**

One of the important nutrients we get from protein-rich foods is iron. Our bodies need iron for red blood cells to carry oxygen to our muscles.

The iron you get in plant foods is called non-heme iron, and our body can't use it as easily as the iron that we get from animal-based foods. So we have to eat a bit more iron-rich foods from plants to get the same iron that we get from animals.

## **4) There's no vitamin B12 in plants.**

Humans need a vitamin called B-12 to support the nervous system, and produce red blood cells. There is no B-12 in plant-based foods (unless supplemented).

It is naturally found in animal-based foods like milk, yogurt, cheese, fish, and meats. If someone does not eat any animal-based foods, it's crucial to supplement by including nutritional yeast regularly and/or working with your doctor to find a supplement.

It's absolutely possible to get all of the nutrients we need from plants. But it's essential to take into consideration what food you like, how much preparation you're willing to do, and the nutrients you need. If you would like to use plants as your source of protein, talk with a dietitian to make sure you have a plan to get the nutrients that you need each day.

## **Questions**

1: Which food groups contain protein?

2: How does protein support the body?

3: How much protein do we need?

4: What are the missing / limited nutrients in a plant based diet?



# ***CHAPTER 5:***

## ***Fat***

***Part 1: What, Why, Where & How Much?***

***Part 2: Myths & Misconceptions***



**What, Why, Where  
& How Much**



**Myths &  
Misconceptions**

# **Part 1: What, Why, Where & How Much**

People often misunderstand fat in our food. Just like the other macronutrients (carbohydrates and protein), our body uses dietary fat for energy, but it also supports our health in surprising ways. And just like the other nutrients, depending on where you get your fat, there are some important things to know.

## **What Is Fat?**

Dietary fat is found in varying amounts in most foods - plants and animals. Just like carbohydrates, there are subcategories or types of dietary fats - unsaturated fats, saturated fats, and trans fats.

Unsaturated fats can be further divided into more subcategories (see chart). What's important to know is that the chemical structure of each is different and as a result, have varying impacts on the body.

## **Why Do We Need It?**

Your body uses fat for a variety of functions - regardless of what type we eat. Dietary fats are a dense source of energy for the body - a small volume contains a large amount of energy. But fats are tough for the body to digest and turn to energy, so they're not an ideal fuel source if you need energy quickly.

Beyond energy, fats of all types serve important functions such as:

- Transport, absorb, and store vitamins A, D, E, and K
- Contribute to sex hormone production and corticosteroids
- Form the outer layer of every cell on our body (aka, the phospholipid bilayer)
- Reduces inflammation in the body which helps recover from sport (Omega 3 fatty acids - a type of unsaturated fat)
- Form much of the brain
- Taste amazing and help us feel satisfied
- Takes long to digest so we feel fuller, longer

## **Where It's Found**

Fats are found in plant and animal foods. In general, the fat found in any given food is not just one type. For example, food is rarely pure unsaturated fat. Instead, it's a combination of saturated and unsaturated sources.

Plant fats and fish fat tend to contain more unsaturated fats. Examples include nuts, seeds, olive oil, olives, avocado, salmon, tuna.

Animal fats and tropical plants tend to have more saturated fat. Examples include beef, pork, chicken, cheese, cream, coconut oil, palm oil.

Trans fats are unique. They are made of "partially hydrogenated" oils. They are not naturally found in foods.

Humans created them years ago to improve the texture and shelf life of processed foods like cookies, cakes, peanut butter, as well as some fried foods. Most trans fats have been removed from our food system, but here and there, you find a few companies still using partially hydrogenated oils.

## **What Do The Types Matter?**

The human body needs dietary fat, but it prefers a balance of fat types for our overall health. When too much of our dietary fat comes from saturated and/or trans fat, it can impact our heart health in the future, increasing the risk of heart attacks and strokes for some people.

In general, most of the fat we eat each day should come from plants and fish or "unsaturated" sources. It's completely ok to have saturated fats, but it's best to keep them a bit smaller part of what we eat.

Trans fats have no benefit for the human body and have been shown to be harmful in large amounts. It's best to avoid them when possible, but understand that a little now and again won't harm you.

# **How Much Do I Need?**

The amount of fat you need each day varies based on how much energy you need overall. As you recall from previous articles, daily energy needs change a lot depending on height, weight, age, physical activity, and so much more. Tracking and/or limiting what you eat based on precise numbers is not recommended, as it's very difficult to predict changing needs.

Our body (and health) care more about the average of what we eat over time - not daily perfection. It's better to follow your personal cues ([link to article about that](#)).

But if you must have a number, in general, the guideline is that 25% of your daily energy comes from fat. For someone eating around 2000 calories per day, that's approximately 55 grams of fat in total from unsaturated and saturated fats. Ideally, saturated fat is 5-6% of total energy or around 13 grams.

Again, those are not hard and fast rules. That doesn't mean if you're above or below these numbers, something will happen to you. Instead, it's a reference point.

But one way in which the numbers can be helpful is when you look at the food label. Often seemingly "healthy" foods can be very high in saturated fat depending on how it was made.

For example, you pick up a bag of chocolate-covered dried bananas - sounds amazing, right? You might assume it would give your body more nutrition than a cookie while still satisfying that sweet tooth.

When you looked at the label though, you are shocked to see that a tiny serving had over 20 grams of saturated fat! That's when you notice the bananas were fried with palm oil. So in that instance, you are better off enjoying a cookie than the deceptive health product. Tricky!

It's much easier to think about fat in terms of food balance. In general, the goal is to try to choose plant or fish fats more often than animal fats while not relying too much on fried foods and processed foods for your energy each day.

Tips to add more unsaturated fats to your routine:

- Enjoy a handful of nuts/seeds between meals
- Add nuts/seeds to meals (yogurt, salads)
- Add avocado to sandwiches and salads
- Add a side of guacamole to snack/meals
- Use guacamole instead of mayo on sandwiches
- Enjoy salmon occasionally
- Enjoy tuna salad sandwiches

# Fat

**Source:** Found in animal and plant based foods

**Function:** Make hormones, absorb / transport nutrients, and flavor / satiety

**Ya-hoo...** Tastes amazing, high energy source

**Uh-oh...** Lots of energy in a small serving. Animal sources of fat are not great for heart health



**Processed  
Foods**



**Animal  
Sources**



**Tropical  
Sources**



**Plant / Fish  
Sources**

LEAST heart healthy

MOST heart healthy

# **Part 2: Myths & Misconceptions**

## **Myth - The fat you eat makes you fat**

No, no, and no. Dietary fat does not become body fat. The fat you eat has to go through a complex process before it's available as energy. If your body doesn't need the energy, yes, it will put it in storage. But that's not unique to fat! Our body is constantly putting nutrients in and out of storage to meet our daily energy needs. Fat is not more easily turned to body fat than any other nutrient.

Where fat is tricky is that it is energy dense. A small portion contains more energy than carbohydrate or protein chemistries. So if you're eating a lot of fat to fill your stomach, it is easier to overeat. But fat is incredibly satisfying.

Typically a food with fat will make you feel fuller, longer and makes the food more enjoyable which helps you feel more satisfied. Avoiding fat and/or choosing fat free foods is actually more likely to make you overeat in the long run because you're hungry more often and don't have the same level of enjoyment.

## **Myth - Coconut oil is good for you**

Coconut oil is all the rage right now. Coconut oil is delicious and gives food a tasty texture and flavor when cooking. But it is pure saturated fat. Eating large amounts of saturated fat over a long period of time can lead to heart health problems in the future. That doesn't mean you can't have coconut oil.

But it's important to use it in smaller amounts, and less often than other sources of fat. Olive oil is still one of the better options for heart health.



**1 T butter**

**7 grams saturated fat**



**1 T Coconut Oil**

**12 grams saturated fat**



**1 T Olive Oil**

**2 grams saturated fat**

## Myth - Meat is bad because of saturated fat

Saturated fat is found in all animal based foods in varying amounts. There is no food you “can’t” have because of its saturated fat content. Instead, it’s about adjusting portions to try to find balance in your overall day, over time. In general, the higher the fat content of the animal based food, the more saturated fat it will have.

<b>Foods with less saturated fat</b>	<b>Medium Saturated Fat</b>	<b>Foods with more saturated fat</b>
Lean ground beef Grilled / baked white meat chicken Grilled / baked fish Part-skim mozzarella cheese Low fat dairy products (milk, yogurt, cheese) Olive oil Canola oil Margarines Egg whites	Dark meat chicken Egg yolks Ham Pork Beef Lamb / goat Full fat dairy products (2% and whole milk products)	Fried chicken Fried fish French fries Dessert (cake, cookie, pie) Chips Ribs High fat deli meats (bologna, salami, pastrami) Bacon Sausage High fat dairy products (Butter, Cheese, Cream) Coconut oil Palm oil
Keep in mind that tables like this can be deceptive because it depends on the portion you have!		

## **Questions**

- 1: How does dietary fat support the body?
- 2: What are the different types of fat in the diet and where are they typically found?
- 3: Which type of fat may negatively impact heart health?



# ***CHAPTER 6:***

# ***Macros***

***Tying It All Together***



**Tying It All**  
**Together**

# **Tying It All Together**

Over the past few chapters, we've created a solid foundation of nutrition science - understanding the role of nutrition in our lives and the different macronutrient chemistries of carbohydrates, proteins, and fats provide us with energy and other vital functions. So now what? How do we apply it all?

Now that we have a firm foundation in what different words in nutrition mean, we can sort through fact and fiction in the food world, to make choices that work for our own lives and circumstance.

## **Apply Macros**

Looking at meals and snacks in terms of macronutrients (carbohydrate, protein, fat) can be a helpful practice to give you consistent energy. But there's no need to "count macros." In fact, I strongly discourage counting calories or macros.

Our body's needs change day to day and even meal to meal based on many factors - and not all of them can be predicted, controlled, or changed. Additionally, counting macros (or calories) often makes it really difficult to enjoy the food in front of you because there's too much concern about doing it "right" or "wrong" instead of listening to your body.

Macros can be a helpful consideration to...

- Create satisfying meals and snacks
- Look at food in terms of science instead of “good” or “bad” by sorting through marketing claims
- Find creative ways of fueling themselves wherever they are

## **Satisfying Meals & Snacks**

The human body operates best when fueled every 3-5 waking hours. When we go longer than that without adding energy to our body, we begin to run out of available fuel. That triggers a cascade of hormone changes that increase our overall appetite, change our food preferences, make us more impulsive around food, and make it more challenging to feel full.

A balanced meal with sufficient energy typically gives sustained energy for around 3-5 hours. And it's not uncommon to add a snack to bridge a gap between meals. But sometimes people find that they eat, and they're hungry an hour or two later. There are many reasons this may occur. But most commonly, it's because they're either not giving themselves enough energy when they eat, or they haven't found the right balance in their macronutrients.

Now, let's be clear that there's no real difference in the definition between a meal and snack besides the intention. A meal is typically intended to hold you over longer than a snack. A meal might last 3-5 hours whereas a snack only lasts 1-2 hours. That's it. It has nothing to do with the types of foods you are "allowed" to eat. Meals by nature tend to be a little bigger than snacks but not always. The point is, it's all just an instance of eating.

## **Creating Meals & Snacks**

There are many ways to look at creating meals and snacks. Macros are one thing to consider. When you look at your plate, how much is carbohydrates? Is there protein present? How about fat?

Too often I see people trying to "eat well" by loading up on vegetables but don't consider that vegetables don't give a body much energy, and they are actually digested pretty quickly (because they are carbs!).

Or they avoid starches and eat only meat, then wonder why they feel sluggish and don't have energy to work out (because they're low on available fuel, aka carbs).

Consider that each meal or snack should have something to give you quick energy (e.g. starch based carbohydrates) paired with something that holds you over (e.g. a protein rich food and/or fat) along with something to add volume and health promotion (e.g. fruits and vegetables)

The amount to choose depends on how much energy you need, what's available, and when you might be working out next.

- If you need readily available energy, dial up the starch based carbohydrates and dial down the fruits and veggies.
- If you need energy rapidly, make it a sugar source
- If you need a meal to feel more satisfying, dial up the protein and fat

You can try to copy someone else's approach, but at the end of the day, there will be changes you make to fit your own needs.

The point is, there's not one right path or solution - it's what works best for you based on the feedback your body is giving you. And if you're struggling to figure out what your body is saying, talk to someone who really understands nutrition, like a registered dietitian.

<b>Quick Energy</b> <b>(moderate energy,</b> <b>quickly digested)</b> <b>Eg, starch based</b> <b>carb or sugar</b>	<b>Sustained Energy</b> <b>(moderate energy,</b> <b>slowly digested)</b> <b>Eg, protein rich</b> <b>foods and/or fats</b>	<b>Health Promoting</b> <b>(but low energy /</b> <b>rapidly digested)</b> <b>Eg, fruits and</b> <b>veggies</b>
Starch based Bread Cereal Pasta Crackers Pretzels Potato Bagel Rice Quinoa Oatmeal  Sugar based Sport drink Dry fruit Gummy candy	Protein Chicken Turkey Tuna Eggs Yogurt Cottage cheese Milk Tofu Tempeh Peanut butter Beans Peas  Fat  Nuts / seeds Avocado Salad dressing	Apple Pear Clementine Banana Blueberries Spinach Carrot Cucumber Celery Tomato Green beans Broccoli

## **Food Labels**

The food label is a great place to start when understanding what exactly is in the food you're eating. While the front of the package is what often strikes our eye with fun graphics and health promises, it does little to tell us about the food's benefit. Instead, it's the "nutrition label" that has the keys to chemistry that decodes the product.

## **The front of the package**

The nutrition or health claims you see on the front of the package are deceiving, and seldom helpful. These claims are what food manufacturers use to get your attention, and sell the product. Some of these claims are regulated - meaning they are monitored by the government for truth.

This can include information about how the food was made (e.g. organic, non-GMO) or it can pertain to the nutrients in the food (e.g. free, low, or reduced fat / sodium / sugar). But other claims are not - meaning the manufacturer can say whatever they want, without proof. This article won't go into what all the claims mean, because at the end of the day, they are not a great way to gauge a product.

## **The back of the package**

The nutrition facts are an objective way to understand the food and more importantly, to make broader food decisions. The numbers are not "rules." You do not need to limit yourself to only eating foods that are "perfect." Instead, it's about identifying your own health goals and how you want the food to serve you.

## Recall what we learned previously:

- **Calories** - overall energy provided by the food. Those calories come from the fat, carbohydrate, and protein. You could do the math if you wanted and you'd see it add up on the package (fat = 9 calories per gram; carbohydrate = 4 calories per gram; protein = 4 calories per gram)
- **Fat** - provides satiety, flavor, hormone creation, cell membrane support, and vitamin / mineral transport / storage.
  - Saturated fat is always on the label because high amounts over time aren't great for heart health
- **Cholesterol and Sodium** - we didn't cover these before but they're on the label to help people with heart disease understand their food balance. Sodium is an electrolyte that supports fluid balance in our cells.
  - Most people do not need to worry about dietary cholesterol as it does not affect blood cholesterol for most people.
  - And most active people do not need to limit their sodium due to sweat losses but people concerned about high blood pressure may need to pay attention.
- **Protein** - awesome for the immune system and cellular repair. Takes longer to digest which keeps us fuller longer but not a great source of rapid energy
- **Vitamins / minerals on the bottom** - helps support cellular functions like vision, immunity, the skeletal system and more

- **Carbohydrates** - overall are a quick source of energy as well as vitamins and minerals.
  - The higher the sugar, relative to the total carbohydrate, the more rapid the energy gets into the body. That's great for athletics, but that also leaves hungry pretty quickly after.
  - Fiber is not digested and has health promoting properties - it also takes longer to digest which keeps us fuller longer. Great for sustaining energy but not ideal right before exercise
- **Ingredient list** - listed by weight starting with highest to lowest. Helps us understand what's in the product and where the nutrients come from as well as navigate food allergies.

So what you ultimately pay attention to is up to you and your personal goals. For example,

- If your goal is sustained fuel, you may look for a food with more fiber, fat, and protein
- If your goal is rapid energy to fuel before an intense workout, you may look for a food or drink without much fiber, fat, and/or protein that is mostly carbohydrate (particularly sugar)

You might not find everything you need in one food. Often times, you may need to combine different foods to meet your goals.

# Digging Into An Example

Another way a label is helpful is when a food doesn't cleanly fit in any of the food groups, is a combination of food groups, or has some fear attached to it.

But all foods have function - including pizza. Pizza is not a "bad" food but it has a tricky reputation. By looking at the label, you can see what it does, and does not provide.

If you check out the below, you can see a lot of pluses...

- A good source of moderate energy from starch - equivalent to 2 slices of bread
- A good source of protein to help with recovery - equivalent to a serving of chicken
- A satisfying food with a bit more energy density due to its fat content - equivalent to 2 slices of cheese
- It also has a decent amount of calcium and iron!

(Hey, we made a sandwich with our equivalents!)

# Nutrition Facts

Serving Size 1/6 Pizza (130g)

Servings Per Container 6

Amount Per Serving

**Calories** 320    **Calories from Fat** 110

%Daily Value\*

**Total Fat** 13 g    **19%**

Saturated Fat 6g    **29%**

**Cholesterol** 25mg    **8%**

**Sodium** 690mg    **29%**

**Total Carbohydrate** 37g    **12%**

Dietary Fiber 2g    **6%**

Sugars 3g

**Protein** 16g

Vitamin A 8%    Vitamin C 0%

Calcium 25%    Iron 15%

\*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

Calories:    2,000    2,500

Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:

Fat 9    Carbohydrate 4    Protein 4

## The considerations are....

- It doesn't have much fiber or antioxidants. And that makes sense - the crust is usually white flour and doesn't have any vegetables besides a little sauce. So a way to make this a more balanced meal would simply be to add vegetables either to the pizza or on the side and consider making the crust whole wheat.

But it also won't "destroy you" if you don't take these steps every single time. But it might be a consideration if pizza is a staple food in your life.

- It also has a decent amount of saturated fat. But that's not a deal breaker either, because nutrition is about averages over time.

If consuming pizza regularly however, you might look at ways to lower the saturated fat by including grilled chicken instead of pepperoni and sausage and/or not making your entire meal pizza every time you have it - maybe adding a side salad, steamed veggies, or fruit.

(Ok, so we made a white bread sandwich)

When you look at the numbers, pizza and a sandwich actually aren't all that different in what they provide the body. Both have benefits (and both benefit from a dose of veggies), but our society has standardized one and demonized the other.

Long story short, it's important to look at a food based on its chemistry - not its reputation. All foods have benefits and missing links - there's no food that is the perfect package just by itself. It's about creating combinations that work for your life, circumstances, and taste buds.

# Wrapping It All Up

These last chapters have focused a lot on chemistry because it's the basic building blocks of how food impacts our body. It's the foundation upon which anyone can grow, and expand their nutrition knowledge.

As we wind down all this chemistry talk, it's important to remember that while there is a science to nutrition, applying it to your everyday life is an art. There are no hard and fast rules about what you can and cannot eat (seriously), but there are people with very strong opinions.

Making decisions about what to eat should have some thought behind it. Avoid letting it consume you in the process. We need food to fuel for our bodies, but it is also a significant part of who we are as people.

The goal of this book is to give you the information to make choices that are reasonable, and available within your world. Whether you're getting your food at home, school, the convenience store, or a restaurant; we hope to help you nourish your body and your soul. We all eat. Enjoy the bites.

## **Questions**

1: How often does the human body like to be fueled?

2: What is the “best” way to balance your meals?

3: Which part of the food label is most valuable to understand a food’s impact on your health?

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# ***NUTRITION 101***

We hope you enjoyed Nutrition 101 presented by Fuel 4 Fitness and PLT4M. We all eat and our nutrition is always going to be a process of trial and error. Please reach out with any questions or comments you might have!

***WRITTEN BY REBECCA TOUTANT***

***PRODUCED BY DOUG CURTIN***

***PUBLISHED BY PLT4M***